In the Claims:

Claims 1, 2, 4 and 6 are amended herein and represent the remaining claims in the application.

1. (currently amended) A ~~two variable~~ data interpolation system for processing image data, wherein an image value between a plurality of discrete image data values is interpolated by performing convolution operation corresponding to the plurality of discrete data positioned at equal intervals in a two dimensional space using a sampling function that is differentiable finite times and has values of a local support, wherein, with letting a third order B spline function be F(t), the sampling function, H(t), is defined as follows:

H(t) = -F(t + 1/2)/4 + F(t) - F(t - 1/2)/4.

2. (currently amended) The ~~two variable~~ data interpolation system according to claim 1, wherein the sampling function is a function that is differentiable only once over a whole region.

3. (canceled)

4. (currently amended) The ~~two variable~~ data interpolation system according to claim 1, wherein the third order B spline function F(t) is expressed as follows:

$(4t^2 + 12t + 9)/4$; $-3/2 \leq t < -1/2$

$-2t^2 + 3/2$; $-1/2 \leq t < 1/2$

(4t^2 - 12t + 9)/4   ; 1/2 ≤ t < 3/2.

5.   (canceled)

6.   (currently amended)   A ~~two variable~~ data interpolation system, wherein a value between a plurality of discrete data is interpolated by performing convolution operation corresponding to the plurality of discrete data positioned at equal intervals in a two dimensional space using a sampling function that is differentiable finite times and has values of a local support,

wherein, with letting a third order B spline function be F(t), the sampling function, (H(t), is defined as follows:

H(t) = -F(t + 1/2)/4 + F(t) - F(t - 1/2)/4, comprising:

discrete data extracting unit for extracting a plurality of discrete data that exist within a predetermined range around a data interpolating position that becomes an object of interpolation operation;

sampling function operating unit for calculating a value of the sampling function H(t) for each of a plurality of discrete data extracted in this manner, with letting distance between the data interpolating position and discrete data be a t; and

convolution operating unit for obtaining a value of the data interpolating position by performing convolution operation through adding values of the sampling function that are calculated by the sampling function operating unit and correspond to the plurality of discrete data respectively.

7. (canceled)

8. (canceled)